

With effect from: 2025-26(R-24)

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderabad-500031

DEPARTMENT OF MATHEMATICS

**NUMERICAL METHODS
(OPEN ELECTIVE)**

For B.E., IV - Semester - CBCS
(Common to CSE, CSE-AIML & IT Branches)

Instruction : 3 Hours per week	Sem. End Exam Marks : 60	Subject Reference Code : U24OE410MA
Credits : 3	Sessional Marks : 40	Duration of Semester End Exam : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<p><i>The course will enable the students to :</i></p> <ol style="list-style-type: none">1. <i>Study</i> various numerical methods to solve Algebraic and Transcendental equations.2. <i>Learn</i> the methods to solve linear system of equations.3. <i>Understand</i> the numerical methods in interpolation and extrapolation.4. <i>Understand</i> the numerical methods in interpolation using central differences.5. <i>Understand</i> numerical methods in solving ordinary differential equations.	<p><i>At the end of the course students should be able to:</i></p> <ol style="list-style-type: none">1. <i>Apply</i> numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods2. <i>Solve</i> linear system of equations using direct and iteration methods.3. <i>Use</i> various numerical methods in interpolation and extrapolation.4. <i>Implement</i> various numerical methods in interpolation using central differences.5. <i>Find</i> numerical solutions of ordinary differential equations.

UNIT – I: (8 Hours)

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:

Algebraic and Transcendental equations: Bisection method - Newton-Raphson method - Regula-Falsi method.

UNIT – II: (8 Hours)

SOLUTION OF SYSTEM OF LINEAR EQUATIONS:

Direct methods - Gauss elimination method - Factorization method - Iterative methods: Jacobi's method – Gauss-Seidel method - Ill-conditioned system of equations.

UNIT – III: (8 Hours)**NUMERICAL DIFFERENCES - I**

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae - Interpolation with unequal intervals - Lagrange's Interpolation Formula - Divided differences - Newton's divided difference formula.

UNIT – IV: (8 Hours)**NUMERICAL DIFFERENCES - II**

Central differences interpolation - Gauss's forwards and backward difference formulae - Stirling's formula - Bessel's formula.

UNIT – V: (8 Hours)**NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS**

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

Text Books:

1. Numerical methods in engineering and science by B.S.Grewal. Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar. Narosa publishing house.

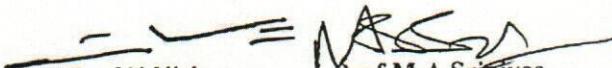
Reference Books:

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

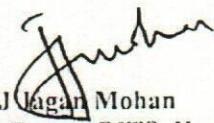
Online Resources:

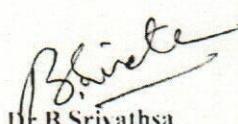
https://onlinecourses.swayam2.ac.in/cec24_ma19/preview

The break-up of CIE: Internal Tests	+ Assignments + Quizzes	
1 No. of Internal Tests	: 2 Max. Marks for each Internal Tests	: 30
2 No. of Assignments	: 3 Max. Marks for each Assignment	: 5
3 No. of Quizzes	: 3 Max. Marks for each Quiz Test	: 5
4 Duration of Internal Tests	: 90 Minutes	

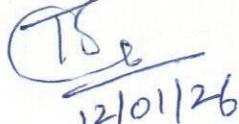

Prof. N. Kishan
(OU Nominee)


Prof. M.A. Srinivas
(Subject Expert-JNTUH)


Dr. J. Jagann Mohan
(Subject Expert-BITS, Hyd)


Dr. B. Srivaths
(Industry Expert)


Dr. T. Sudhakar Rao
(Chairman, BOS)


12/01/26.